```
MMM          MMM  TTTTTTTTTTTTTTT   HHH          HHH  RRRRRRRRRRR     TTTTTTTTTTTTTTT   LLL
MMM          MMM  TTTTTTTTTTTTTTT   HHH          HHH  RRRRRRRRRRRR    TTTTTTTTTTTTTTT   LLL
MMM          MMM  TTTTTTTTTTTTTTT   HHH          HHH  RRRRRRRRRRRR    TTTTTTTTTTTTTTT   LLL
MMMMMM    MMMMMM        TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMMMMM    MMMMMM        TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMMMMM    MMMMMM        TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMM   MMM   MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMM   MMM   MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMM   MMM   MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMM         MMM         TTT         HHHHHHHHHHHHHHHH  RRRRRRRRRRR           TTT         LLL
MMM         MMM         TTT         HHHHHHHHHHHHHHHH  RRRRRRRRRRRR          TTT         LLL
MMM         MMM         TTT         HHHHHHHHHHHHHHHH  RRRRRRRRRRRR          TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR   RRR             TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR   RRR             TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR   RRR             TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR      RRR          TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR      RRR          TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR      RRR          TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLLLLLLLLLLLLLLL
MMM         MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLLLLLLLLLLLLLLL
MMM         MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLLLLLLLLLLLLLLL
```

FILEID**MTHMOD

```
MM      MM  TTTTTTTTTT  HH      HH  MM      MM    000000    DDDDDDDD
MM      MM  TTTTTTTTTT  HH      HH  MM      MM    000000    DDDDDDDD
MMMM  MMMM      TT      HH      HH  MMMM  MMMM  00      00  DD      DD
MMMM  MMMM      TT      HH      HH  MMMM  MMMM  00      00  DD      DD
MM  MM  MM      TT      HH      HH  MM  MM  MM  00      00  DD      DD
MM  MM  MM      TT      HH      HH  MM  MM  MM  00      00  DD      DD
MM      MM      TT      HHHHHHHHHH  MM      MM  00      00  DD      DD
MM      MM      TT      HHHHHHHHHH  MM      MM  00      00  DD      DD
MM      MM      TT      HH      HH  MM      MM  00      00  DD      DD
MM      MM      TT      HH      HH  MM      MM  00      00  DD      DD
MM      MM      TT      HH      HH  MM      MM  00      00  DD      DD
MM      MM      TT      HH      HH  MM      MM  00      00  DD      DD
MM      MM      TT      HH      HH  MM      MM    000000    DDDDDDDD
MM      MM      TT      HH      HH  MM      MM    000000    DDDDDDDD

LL              IIIIII      SSSSSSSS
LL              IIIIII      SSSSSSSS
LL                II      SS
LL                II      SS
LL                II      SS
LL                II      SS
LL                II        SSSSSS
LL                II        SSSSSS
LL                II              SS
LL                II              SS
LL                II              SS
LL                II              SS
LLLLLLLLLL      IIIIII    SSSSSSSS
LLLLLLLLLL      IIIIII    SSSSSSSS
```

Table of contents

(2) 50 HISTORY ; Detailed Current Edit History
(3) 59 DECLARATIONS
(4) 90 MTH$MOD
(5) 135 MTH$JMOD

```
0000     1          .TITLE  MTH$MOD         FORTRAN MOD ROUTINES
0000     2          .IDENT  /1-002/         ; File: MTHMOD.MAR
0000     3
0000     4 ;
0000     5 ;*****************************************************************************
0000     6 ;*                                                                           *
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0000    24 ;*                                                                           *
0000    25 ;*                                                                           *
0000    26 ;*****************************************************************************
0000    27 ;
0000    28 ;
0000    29 ; FACILITY: MATH LIBRARY
0000    30 ;++
0000    31 ; ABSTRACT:
0000    32 ;       This module contains routines IMOD and JMOD:
0000    33 ;       Return remainder after divisor.
0000    34 ;
0000    35 ;
0000    36 ;--
0000    37 ;
0000    38 ; VERSION: 0
0000    39 ;
0000    40 ; HISTORY:
0000    41 ;
0000    42 ; AUTHOR:
0000    43 ;       Jonathan M. Taylor, 11-JUL-77: Version 0
0000    44 ;
0000    45 ; MODIFIED BY:
0000    46 ;
0000    47 ;
0000    48 ;
```

```
0000     50          .SBTTL  HISTORY          ; Detailed Current Edit History
0000     51
0000     52
0000     53 ; Edit History for Version 0 of MTHMOD
0000     54 ;
0000     55 ; 0-3    - Remove MTH$FLAG_JACKET.  TNH 5-July-78
0000     56 ; 1-001  - Update version number and copyright notice.  JBS 16-NOV-78
0000     57 ; 1-002  - Add "_" to the PSECT directive.  JBS 22-DEC-78
```

```
                     59          .SBTTL  DECLARATIONS
                     60
                     61 ;
                     62 ; INCLUDE FILES:
                     63 ;       oerr.mar
                     64 ;
                     65
                     66 ;
                     67 ; EXTERNAL SYMBOLS:
                     68 ;       NONE
                     69 ;
                     70
                     71 ;
                     72 ; MACROS:
                     73 ;       NONE
                     74 ;
                     75
                     76 ;
                     77 ; PSECT DECLARATIONS:
00000000             78          .PSECT  _MTH$CODE       PIC, SHR, LONG, EXE, NOWRT
                     79
                     80 ;
                     81 ; EQUATED SYMBOLS:
                     82 ;       NONE
                     83 ;
                     84
                     85 ;
                     86 ; OWN STORAGE:
                     87 ;       NONE
                     88 ;
```

```
                                                .SBTTL  MTH$MOD

                                                ;++
                                                ; FUNCTIONAL DESCRIPTION:
                                                ;       Return remainder after division.
                                                ;
                                                ;
                                                ; CALLING SEQUENCE:
                                                ;       Remainder.ww.v = MTH$IMOD (dividend.rw.r, divisor.rw.r)
                                                ;
                                                ;
                                                ; INPUT PARAMETERS:
                                                ;       The two parameters are one-word values and are call-by-reference.
                                                ;
                                                ;
                                                ; IMPLICIT INPUTS:
                                                ;       NONE
                                                ;
                                                ; OUTPUT PARAMETERS:
                                                ;       NONE
                                                ;
                                                ; IMPLICIT OUTPUTS:
                                                ;       NONE
                                                ;
                                                ; COMPLETION CODES:
                                                ;       NONE
                                                ;
                                                ; SIDE EFFECTS:
                                                ;       Integer Overflow and Divide by Zero exceptions can occur.
                                                ;
                                                ;--


                                        4004    .ENTRY  MTH$IMOD,       ^M<R2, IV> ; enable integer overflow
      50    04 BC    32                       CVTWL   @4(AP), R0      ; R0 = divd
50    00    01    50   7A                       EMUL    R0, #1, #0, R0  ; R0/R1 = quadword divd
      52    08 BC    32                       CVTWL   @8(AP), R2      ; R2 = divr
50    50    50    52   7B                       EDIV    R2, R0, R0, R0  ; R0 = longword remainder
            50    50   F7                       CVTLW   R0, R0          ; R0 = word remainder
                       04                       RET
```

```
                     0018   135          .SBTTL  MTH$JMOD
                     0018   136
                     0018   137 ;++
                     0018   138 ; FUNCTIONAL DESCRIPTION:
                     0018   139 ;       Return the remainder after division.
                     0018   140 ;
                     0018   141 ;
                     0018   142 ; CALLING SEQUENCE:
                     0018   143 ;       Remainder.wl.v = MTH$JMOD (dividend.rl.r, divisor.rl.r)
                     0018   144 ;
                     0018   145 ;
                     0018   146 ;
                     0018   147 ; INPUT PARAMETERS:
                     0018   148 ;       The two parameters are longword values and are call-by-reference.
                     0018   149 ;
                     0018   150 ;
                     0018   151 ; IMPLICIT INPUTS:
                     0018   152 ;       NONE
                     0018   153 ;
                     0018   154 ; OUTPUT PARAMETERS:
                     0018   155 ;       NONE
                     0018   156 ;
                     0018   157 ; IMPLICIT OUTPUTS:
                     0018   158 ;       NONE
                     0018   159 ;
                     0018   160 ; COMPLETION CODES:
                     0018   161 ;       NONE
                     0018   162 ;
                     0018   163 ; SIDE EFFECTS:
                     0018   164 ;       NONE
                     0018   165 ;
                     0018   166 ;--
                     0018   167
                     0018   168
                4004 0018   169          .ENTRY  MTH$JMOD,       ^M<R2, IV> ; enable integer overflow
 50   00   01   04 BC  7A 001A   170          EMUL    @4(AP), #1, #0, R0 ; R0 = quadword divd
 50   50   50   08 BC  7B 0020   171          EDIV    @8(AP), R0, R0, R0 ; R0 = longword remainder
                  04    0026   172          RET
                        0027   173
                        0027   174
                        0027   175          .END
```

```
MTH$IMOD            00000000 RG    01
MTH$JMOD            00000018 RG    01
```

Psect synopsis

```
PSECT name                      Allocation          PSECT No.  Attributes
----------                      ----------          ---------  ----------
. ABS .                         00000000  (    0.)  00 (  0.)  NOPIC   USR   CON   ABS   LCL NOSHR NOEXE NORD  NOWRT NOVEC BYTE
_MTH$CODE                       00000027  (   39.)  01 (  1.)    PIC   USR   CON   REL   LCL   SHR   EXE   RD  NOWRT NOVEC LONG
```

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	31	00:00:00.10	00:00:00.59
Command processing	133	00:00:00.46	00:00:03.45
Pass 1	68	00:00:00.43	00:00:03.08
Symbol table sort	0	00:00:00.00	00:00:00.00
Pass 2	45	00:00:00.37	00:00:01.02
Symbol table output	1	00:00:00.01	00:00:00.01
Psect synopsis output	3	00:00:00.02	00:00:00.02
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	283	00:00:01.39	00:00:08.22

```
The working set limit was 900 pages.
1815 bytes (4 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 2 non-local and 0 local symbols.
175 source lines were read in Pass 1, producing 13 object records in Pass 2.
0 pages of virtual memory were used to define 0 macros.
```

Macro library statistics

Macro library name	Macros defined
_255DUA28:[SYSLIB]STARLET.MLB;2	0

```
0 GETS were required to define 0 macros.

There were no errors, warnings or information messages.

MACRO/ENABLE=SUPPRESSION/DISABLE=(GLOBAL,TRACEBACK)/LIS=LIS$:MTHMOD/OBJ=OBJ$:MTHMOD MSRC$:MTHMOD/UPDATE=(ENH$:MTHMOD)
```

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MTHJMIN0
LIS

MTHMSG
LIS

MTHIMIN0
LIS

MTHMAX1
LIS

MTHJIDNNT
LIS

MTHMSGDEF
LIS

MTHJIHNNT
LIS

MTHSGN
LIS

MTHJMAX0
LIS

MTHMOD
LIS

MTHSIGNAL
LIS

MTHSQRTR2
LIS

MTHJNINT
LIS

MTHSINCOS
LIS

MTHSQRT
LIS

MTHININT
LIS

MTHRANDOM
LIS

MTHJIGNNT
LIS

MTHMIN1
LIS

MTHJISIGN
LIS

MTHSIGN
LIS

MTHSINH
LIS